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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,395	02/26/2004	Chiaki Kumada	Q80012	2869
23373	7590	12/29/2004	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			JEFFERY, JOHN A	
			ART UNIT	PAPER NUMBER
			3742	

DATE MAILED: 12/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/786,395	KUMADA ET AL.	
	Examiner	Art Unit	
	John A. Jeffery	3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3 and 4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3 and 4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>20040330</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Joint Inventors--Common Ownership Presumed

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligations under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Sperner et al (US 4,358,663) and further in view of Izzi (US 4,582,980). In Fig. 2 and Paras. 02-04 of the instant application, applicant

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admits to be old and well known a glow plug comprising all of the structure claimed except for the heating coil portion to have a coating layer comprising Pt, Pd, Rh, or an alloy containing two or more of such elements. Sperner et al (US 4,358,663), however, teaches coating a heater coil core with a metal from the platinum group or an alloy comprising at least one metal from the platinum group. Col. 3, lines 25-41. As noted in col. 3, lines 10-14, platinum is used because of its chemical stability and good fabrication qualities.

In view of Sperner et al (US 4,358,663), it would have been obvious to one of ordinary skill in the art to provide a heater coil with a platinum coating in lieu of the uncoated heater wire of admitted prior art glow plug to increase the heater wire's chemical stability at elevated temperatures, thereby prolonging heater life.

The claims also differ from the previously cited prior art in calling for the heating coil to comprise a Fe-Cr-Al alloy. But such alloys are commonly used for heater coils in glow plugs as evidenced by Izzi (US 4,582,980) noting col. 3, lines 28-35. As noted in the passage, Fe-Cr-Al alloys are preferred in glow plugs in view of the alloy's high electrical resistance and low temperature coefficient.

In view of Izzi (US 4,582,980), it would have been obvious to one of ordinary skill in the art to use an Fe-Cr-Al alloy in the heater coil of the previously described apparatus so that a high-resistance alloy with low temperature coefficient was used for the heater coil, thus ensuring rapid heat-up and improved heating control.

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Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Sperner et al (US 4,358,663), Izzzi, and further in view of JP2001-153359. The claim differs from the previously cited prior art in calling for the coating layer to have a thickness from 0.2-0.5 microns. Such thicknesses for platinum coating layers, however, are known in the art as evidenced by JP2001-153359 noting Para. 0010 of the computer translation in which the platinum coating is from 0.5 – 10 microns. Thus, the lower limit of JP2001-153359 includes the claimed upper limit of 0.5 microns. As noted in Para. 0010, if the platinum coating is too thin, peeling or oxidation of the core may result. On the other hand, if the platinum coating is too thick, the device will be too expensive.

In view of JP2001-153359, it would have been obvious to one of ordinary skill in the art to coat the wire core with a platinum coating having within the claimed thickness range to prevent peeling or oxidation, yet minimize the amount of platinum need thus reducing cost.

Response to Arguments

Applicant's arguments filed 11/12/04 have been considered but are not deemed to be persuasive. Applicant first argues that Sperner does not disclose a Fe-Cr-Al core or an insulating powder embedding the coil. Remarks, at 7. Although applicant is correct in that assertion, the examiner did not cite Sperner for those features. The base "reference" -- the admitted prior art -- amply shows a glow plug with insulating powder embedding the coil. And, as will be discussed later, there is not only ample suggestion

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in Izzi to utilize Fe-Cr-Al alloys as electric heater wires, the prior art is replete with such teachings.

Rather, Sperner was cited merely to show it would have been obvious to the skilled artisan to provide a Pt coating on an uncoated heater wire in a glow plug to enhance the heater wire's chemical stability at elevated temperatures. In short, the heater wire will last longer at elevated temperatures with a Pt coating than it would if it were not coated. Such a teaching is readily apparent from Sperner and properly combinable with the admitted prior art glow plug because there is ample motivation to combine the references and both references are in the same field of endeavor.

Applicant next argues that it would not be obvious to the skilled artisan to substitute the Fe-Cr-Al alloy of Izzi as the core material in the prior art glow plugs. Remarks, at 7. Specifically, applicant notes that because Izzi discloses a Ni coating, and the coated region of the wire functions as a control resistor -- not an electric heater -- the Ni coating is an integral part of the control resistor. Therefore, according to applicant, substituting only the core Fe-Cr-Al material, but omitting the Ni coating, would destroy the filament's intended control resistance function. Remarks, at 7-8.

The examiner acknowledges Izzi's control resistance function of the coated filament region in conjunction with the uncoated region's heating function. As applicant notes, Izzi achieves this function since the Fe-Cr-Al filament has a high electrical resistance and low temperature coefficient, while Ni has a low electric resistivity and high temperature coefficient. Remarks, at 7 (quoting Izzi at col. 3, lines 32-35).

But Ni is not the only material suitable for Izzì's coating as applicant seems to suggest. In fact, Izzì states that "other materials could be used, provided having [*sic* -- such materials have] similar thermal, electric, [and] mechanical characteristics. Col. 4, lines 40-44. According to metallurgical data tabulated in the attached "Properties of Metals and Alloys for Resistance Wires" published by Driver-Harris Co., Pt and Ni have substantially similar values of specific resistance, temperature coefficient of resistance, thermal conductivity, and melting point. These values are summarized in the table below:

	Specific Resistance (<i>micro-ohm per cm³</i>)	Temperature Coefficient of Resistance	Thermal Conductivity (<i>W/cm-°C</i>)	Melting Point (°C)
Nickel	10.000	0.00500	0.615	1450
Platinum	10.610	0.00398	0.695	1755

Therefore, because Pt and Ni have similar thermal, electrical, and mechanical characteristics, Pt would be a suitable substitute material for Izzì's Ni coating.

And even if, for the sake of argument, Sperner's teaching of a Pt coating was somehow not suitable for coating a core Fe-Cr-Al alloy, the prior art is replete with examples of glow plug heating filaments made of Fe-Cr-Al alloys. Indeed, Fe-Cr-Al alloys are so well known in the glow plug art that such materials are commonly listed as an alternative for Ni-Cr as a suitable heating filament alloy. Representative examples include Simpkins (US 6,465,759) in col. 4, lines 43-45 and Chiu et al (US 6,512,204) in

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col. 4, lines 57-59 (noting that the glow plug heating filament can be a metal material including Fe-Cr-Al or Ni-Cr).¹ In short, Fe-Cr-Al alloys are well known heating filament alloys in glow plugs and their use -- even when coated with Pt -- does not patentably distinguish over the cited prior art. The rejection is proper.

Final Rejection

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. Jeffery whose telephone number is (571) 272-

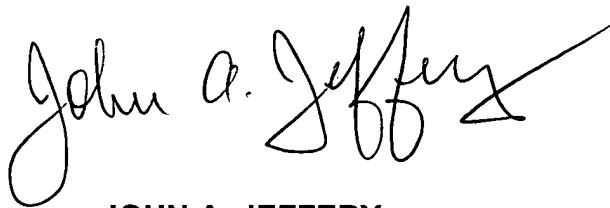
¹ Although not relied upon in the rejections, these references are cited merely for illustrative purposes as further evidence of the well-known usage of Fe-Cr-Al alloys as glow plug heating filaments.

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4781. The examiner can normally be reached on Monday - Thursday from 7:00 AM to 4:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans, can be reached on (571) 272-4777. All faxes should be sent to the centralized fax number at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, reading "John A. Jeffery". The signature is stylized with a large, looped "J" and a long, sweeping horizontal stroke at the end.

**JOHN A. JEFFERY
PRIMARY EXAMINER**

12/23/04